

WHAT IS CLAIMED IS:

1. A method of optimizing a finite state machine having nodes that are interconnected by links, the method comprising:

removing a label from a node in the finite state machine;

changing the structure of the finite state machine to form an optimized finite state machine; and

placing the label in a node of the optimized finite state machine.

2. The method of claim 1 further comprising adding the label from the node to a label for a link attached to the node before changing the structure of the finite state machine.

3. The method of claim 2 wherein adding the label from the node comprises appending the label to the end of the label for the link if the link is an incoming link to the node.

4. The method of claim 3 wherein adding the label from the node comprises appending the label to the beginning of the label for the link if the link is an outgoing link from the node.

5. The method of 4 wherein adding the label from the node to a label for a link further comprises adding the label from the node to the labels of each link that connects to the node.

6. The method of claim 5 further comprising removing the labels from each node in the finite state machine.
7. The method of claim 2 wherein placing a label in a node comprises removing the label from a label for a link connected to the node and storing the removed label in the node.
8. The method of claim 7 wherein removing the label from a label for a link comprises removing a suffix of the label for the link if the link is an incoming link to the node.
9. The method of claim 8 wherein removing the label from a label for a link comprises removing a prefix of the label for the link if the link is an outgoing link from the node.
10. The method of claim 9 further comprising before placing the label in the node, determining that the prefixes of the labels on all of the links that are incoming to the node match each other.
11. The method of claim 10 further comprising before placing the label in the node, determining that the suffixes of the labels on all of the links that are outgoing from the node match each other.

12. The method of claim 1 wherein changing the structure of the finite state machine comprises performing a determinization algorithm.

13. The method of claim 1 wherein changing the structure of the finite state machine comprises performing a minimization algorithm.

14. The method of claim 1 wherein the finite state machine is a finite state transducer.

15. The method of claim 14 wherein the finite state transducer is a weighted finite state transducer.

16. The method of claim 1 wherein the finite state machine is a finite state acceptor.

17. The method of claim 16 wherein the finite state acceptor is a weighted finite state acceptor.

18. A computer-readable medium having computer-executable instructions for performing steps comprising:

defining a finite state machine that includes nodes connected by links, wherein the nodes and the links are labeled;
removing the labels from the nodes;
changing the structure of the finite state machine; and

inserting labels on the nodes.

19. The computer-readable medium of claim 18 wherein removing a label from a node comprises adding the label to the respective labels of each link connected to the node before deleting the label from the node.

20. The computer-readable medium of claim 19 wherein adding a label from a node to a label of a link comprises appending the label from the node to the end of the label of the link if the link leads into the node.

21. The computer-readable medium of claim 19 wherein adding a label from a node to a label of a link comprises appending the label from the node to the beginning of the label of the link if the link leads out of the node.

22. The computer-readable medium of claim 18 wherein changing the structure of the finite state machine comprises optimizing the finite state machine.

23. The computer-readable medium of claim 22 wherein optimizing the finite state machine comprises removing a node from the finite state machine.

24. The computer-readable medium of claim 19 wherein inserting a label on a node comprises

removing a portion of a label on a link connected to the node and inserting the removed portion as the label for the node.

25. The computer-readable medium of claim 24 wherein the portion removed from the label on the link is an ending portion of the label on the link if the link is an incoming link to the node.

26. The computer-readable medium of claim 24 wherein the portion removed from the label on the link is a beginning portion of the label on the link if the link is an outgoing link from the node.

27. The computer-readable medium of claim 19 wherein adding a label from a node to a label for a link comprises inserting a separator between the label from the node and the label for the link.